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10/766,132	01/27/2004	William A. Sirignano	703538.4032	1974

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EXAMINER

COCKS, JOSIAH C

ART UNIT	PAPER NUMBER
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3749

DATE MAILED: 06/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/766,132

Applicant(s)

SIRIGNANO ET AL.

Examiner

Josiah Cocks

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 March 2005.
2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12, 15-17, 19-21, 24 and 25 is/are pending in the application.
4a) Of the above claim(s) 24 and 25 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-12, 15-17, and 19-21 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Receipt of applicant's amendment filed 3/21/2005 is acknowledged.

Priority

2. Applicant's claim for the benefit of an earlier filing date under 35 U.S.C. 120 is acknowledged.

Election/Restrictions

3. Newly submitted claims 24 and 25 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: The steps of using a force field to create a liquid film layer is a patentably distinct species of invention from the use of injection orifices.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 24 and 25 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the

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examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

Drawings

4. Further review of the drawings reveals that new corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the drawings filed 1/27/2004 appear to include poor line, text, and reference numeral quality (Figs. 1-6) and poor shading quality (Fig. 8). Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

INFORMATION ON HOW TO EFFECT DRAWING CHANGES

Replacement Drawing Sheets

Drawing changes must be made by presenting replacement sheets which incorporate the desired changes and which comply with 37 CFR 1.84. An explanation of the changes made must be presented either in the drawing amendments section, or remarks, section of the amendment paper. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). A replacement sheet must include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of the amended drawing(s) must not be labeled as "amended." If the changes to the drawing figure(s) are not accepted by the examiner, applicant will be notified of any required corrective action in the next Office action. No further drawing submission will be required, unless applicant is notified.

Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and within the top margin.

Annotated Drawing Sheets

A marked-up copy of any amended drawing figure, including annotations indicating the changes made, may be submitted or required by the examiner. The annotated drawing sheet(s) must be clearly labeled as "Annotated Sheet" and must be presented in the amendment or remarks section that explains the change(s) to the drawings.

Timing of Corrections

Applicant is required to submit acceptable corrected drawings within the time period set in the Office action. See 37 CFR 1.85(a). Failure to take corrective action within the set period will result in ABANDONMENT of the application.

If corrected drawings are required in a Notice of Allowability (PTOL-37), the new drawings MUST be filed within the THREE MONTH shortened statutory period set for reply in the "Notice of Allowability." Extensions of time may NOT be obtained under the provisions of 37 CFR 1.136 for filing the corrected drawings after the mailing of a Notice of Allowability.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In regard to the recitation in claim 1 of a "means for forming a liquid film on the chamber's interior surface," this recitation is considered to invoke 35 U.S.C. § 112, 6th paragraph. The corresponding structure(s) are an orifice, multiple injectors (14 and 16) that inject liquid fuel into the chamber in a manner that aids "filming of the fuel tangentially over the inner surface of the chamber wall 17" (see applicant's specification, p. 9, lines 12-15) or

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injection through porous materials (see applicant's specification, p. 8, lines 9-12 and p. 10, lines 2-3). However, it is noted that claim 1 already includes a recitation of a liquid-fuel inlet into the chamber. It appears that the introduction of the "means for" statement again recites a liquid fuel inlet. Accordingly, it is unclear what additional structure applicant intended to recite with the "means for" clause. For the purpose of an examination on the merits, the "means for" clause has been considered to replace the "liquid-fuel inlet" limitation.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1-4, 6, 7, 10-12, 15, 16, and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 2,918,118 to Schirmer ("Schirmer '118").

Schirmer '118 discloses in Figures 1-6 the invention substantially as claimed by applicant with the exception of the lateral dimension of the chamber being sub-centimeter, and more particularly in the range of 1.0 to 3.0 millimeters, and the length being in the range of 1.0 to 10.0 centimeters.

In Schirmer '118, the porous tube (15) diffuses liquid fuel into the chamber (18). As noted in the first paragraph of column 3, "[t]he use of liquid fuel in this combustion apparatus provides for self-regulation of the wall temperature of the flame tube in accordance with the latent heat absorbed in the vaporization process occurring on the inner surface of the primary combustion chamber." Schirmer '118 also states that "the fuel is delivered uniformly onto the entire inner surface of the primary combustion chamber." (see col. 1, line 68 through col. 2, line 1). Thus, the apparatus operates in the same manner as applicant's apparatus. See pages 6 and 7 of applicant's specification.

In regard to the limitations relating to the size/dimensions of the combustion chamber, it has been held that limitations relating to the size of the package were not sufficient to patentably distinguish over the prior art. See MPEP § 2144.04(IV)(A). Thus, it would have been obvious to one of ordinary skill in the art at the time of applicant's invention to have scaled the apparatus of Schirmer '118 to applicant's dimensions since it has been held that limitations relating to the size of the packet were not sufficient to patentably distinguish over the prior art and the apparatus of Schirmer '118 operates in the same manner as applicant's apparatus.

In regard to claim 7, the pores of tube (15) comprise a plurality of orifices.

10. Claims 1-5, 7, 10, 11, 15, 16, and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 3,078,672 to Meurer ("Meurer").

Meurer discloses in Figures 1-4 the invention substantially as claimed with the exception of the lateral dimension of the chamber being sub-centimeter, and more particularly in the range of 1.0 to 3.0 millimeters, and the length being in the range of 1.0 to 10.0 centimeters.

The nozzle (3) of Meurer emits liquid fuel into the chamber (1). As noted in the last paragraph of column 2:

"Fuel injection nozzle 3 represents but one of several nozzles which may be used. The fuel emerges through the slit opening 3a and is immediately deposited upon the inner wall of chamber 1 as a solid fuel jet 4 and, without traversing any free path, is immediately spread as a film of fuel 4a on the inner all of chamber 1."

Thus the apparatus operates in the same manner as applicant's apparatus. See pages 6 and 7 of applicant's specification.

In regard to claim 3, see column 2, line 8 of Meurer.

In regard to the limitations relating to the size/dimensions of the combustion chamber, it has been held that limitations relating to the size of the package were not sufficient to patentably distinguish over the prior art. See MPEP § 2144.04(IV)(A). Thus, it would have been obvious to one of ordinary skill in the art at the time of applicant's invention to have scaled the apparatus of Meurer to applicant's dimensions since it has been held that limitations relating to the size of the packet were not sufficient to patentably distinguish over the prior art and the apparatus of Meurer operates in the same manner as applicant's apparatus.

11. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meurer as applied to claim 7 above, and further in view of U.S. Patent No. 3,955,361 to Schirmer et al. ("Schirmer '361").

Meurer discloses all the limitations of claim 8 and 9 except for the injector oriented tangentially and orthogonally to the major flow within the chamber.

Schirmer '361 discloses a fuel/air mixer/combustion chamber and teaches the use of injectors (49) oriented tangentially and orthogonally to the major flow within the chamber to form an annular stratum around the swirling stream of air to effect controlled mixing of the fuel and air. See Fig. 7.

Thus, it would have been obvious to one of ordinary skill in the art at the time of applicant's invention to provide the apparatus of Meurer with the injectors oriented tangentially and orthogonally to the major flow within the chamber as taught by Schirmer '118 to form an annular stratum around the swirling stream of air to effect controlled mixing of the fuel and air.

12. Claims 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,604,988 to Rao ("Rao").

Rao discloses in Figures 1-14 the invention as claimed including forming a liquid film or inert liquid (water) inside line 23 and injecting gaseous fuel (see col. 6, line 47).

In regard to the limitations relating to the size/dimensions of the combustion chamber, it has been held that limitations relating to the size of the package were not sufficient to patentably distinguish over the prior art. See MPEP § 2144.04(IV)(A). Thus, it would have been obvious to one of ordinary skill in the art at the time of applicant's invention to have scaled the apparatus

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of Rao to applicant's dimensions since it has been held that limitations relating to the size of the packet were not sufficient to patentably distinguish over the prior art and the apparatus of Rao operates in the same manner as applicant's apparatus.

Double Patenting

13. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

14. Claims 1-12, 15-17, and 19-21 rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of U.S. Patent No. 6,877,978.

In regard to claims 1-12, while these claims are broader in scope, they are claiming the same invention as that of claims 1-10 of U.S. Patent No. 6,877,978.

In regard to claims 15-17 and 19-21 these claims claim essentially the same invention as claims 11-16 of U.S. Patent No. 6,877,978 but include a recitation that the chamber is sub-centimeter. It has been held that limitations relating to the size of the package were not sufficient to patentably distinguish over the prior art. See MPEP § 2144.04(IV)(A). Accordingly, the claims 15-17 and 19 of this application are not considered to be obvious in view of claims 11-16 of U.S. Patent No. 6,877,978.

Response to Arguments

15. The declarations under 37 CFR 1.132 filed 3/21/2005 are insufficient to overcome any he rejection of the claims based as set forth in the last Office action. These declarations assert that a combustor having sub-centimeter dimensions as claimed is distinct from larger systems in the forming of a liquid fuel film on the chamber walls. In these larger systems it is asserted that the fuel is typically injected as a spray (see declaration of Fernandez-Pello, paragraph 7 and declaration of Paul Rooney, paragraph 7). However, the examiner notes that Schirmer '118 clearly discloses that a fuel is uniformly distributed over the entire surface of the combustion chamber and forms a shear interface (see col. 2, lines 11-22). This disclosure is considered to be a liquid fuel film layer as claimed and not a spray as asserted in the declarations to be typically of the prior art. Likewise, Meurer clearly discloses that liquid fuel is supplied to the combustion chamber to form a film on the inner wall of the combustion chamber (see col. 2, lines 65-72).

The declarations also assert that neither Schirmer '118 or Meurer teach that a liquid fuel film that addresses the issues of heat loss or quenching. As noted above, Schirmer '118 and Meurer are each regarded to teach the application of a liquid fuel film. The examiner further notes that the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

The declarations also assert that none of the prior art show a stable liquid fuel film formed on the inner surface. This argument is not relevant as the claims do not require a "stable" liquid fuel film. Accordingly, the examiner has not considered whether the films of Schirmer '118 or Meurer are considered stable.

The declarations also assert that in Rao only heat transfer and no mass transfer occur between the liquid and the core gas flow. However, Rao clearly teaches that the invention disclosed therein is intended to be applied to effecting mass transfer between gas and liquid flows (See Abstract, col. 2, line 60 through col. 3, line 6 and col. 4, lines 9-13). The declarations also assert that that class of devices disclosed in Rao does not include combustors. Yet, Rao clearly discloses that the device is intended to maintain a flame (see at least col. 2, lines 35-37 and col. 3, lines 1-6). The class of devices disclosed in Rao clearly does include combustors.

Applicant's arguments have been carefully considered in conjunction with the declarations but are not considered persuasive. Applicant's main argument is that the prior art relied upon do not show miniature combustors with a combustion chamber having a lateral dimension that is sub-centimeter. As noted above, it has been held that merely altering the size

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of a device does not patentably distinguish over the prior art when the only difference between the claimed invention and prior art are the relative dimensions. See MPEP § 2144.04(IV)(A).

The examiner considers that the prior art relied upon show both the structure and process claimed by applicant, including the formation of liquid fuel films on the inner walls of chambers. Accordingly, applicant's claims are not considered to patentably distinguish over the prior art of record.

Conclusion

16. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Josiah Cocks whose telephone number is (571) 272-4874. The examiner can normally be reached on weekdays from 8:00 AM


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to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ira Lazarus, can be reached at (571) 272-4877. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://portal.uspto.gov/external/portal/pair>. Any questions on access to the Private PAIR system should be directed to the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).

jcc
June 6, 2005


JOSIAH COCKS
PRIMARY EXAMINER
ART UNIT 3749